

CLAIMS

1. An isolated polynucleotide selected from the group consisting of
 - (a) a polynucleotide comprising a coding region of the nucleotide sequence set forth in any one of the following SEQ ID NOs:
 - 5 SEQ ID NO: 1, 3, 5, and 7;
 - (b) a polynucleotide comprising a nucleotide sequence encoding a protein comprising the amino acid sequence set forth in any one of the following SEQ ID NOs:
SEQ ID NO: 2, 4, 6, and 8;
 - (c) a polynucleotide comprising a nucleotide sequence encoding a protein comprising
10 an amino acid sequence selected from the amino acid sequences of (b), in which one or more amino acids are substituted, deleted, inserted, and/or added, wherein said protein is functionally equivalent to the protein comprising said amino acid sequence selected from the amino acid sequences of (b);
 - (d) a polynucleotide that hybridizes with a polynucleotide comprising a nucleotide
15 sequence selected from the nucleotide sequences of (a), and that comprises a nucleotide sequence encoding a protein functionally equivalent to the protein encoded by the nucleotide sequence selected from the nucleotide sequences of (a);
 - (e) a polynucleotide comprising a nucleotide sequence encoding a partial amino acid sequence of a protein encoded by the polynucleotide of (a) to (d);
 - 20 (f) a polynucleotide comprising a nucleotide sequence with at least 70% identity to the nucleotide sequence of (a).
 2. A substantially pure protein encoded by the polynucleotide of claim 1.
 3. A partial peptide of the protein of claim 2.
 4. An antibody against the protein of claim 2 or the peptide of claim 3.
 - 25 5. A vector comprising the polynucleotide of claim 1.
 6. A transformant carrying the polynucleotide of claim 1 or the vector of claim 5.
 7. A transformant expressively carrying the polynucleotide of claim 1 or the vector of claim 5.
 8. A method for producing the protein of claim 2 or the peptide of claim 3, comprising
30 culturing the transformant of claim 7 and recovering the expression product.
 9. An oligonucleotide comprising the nucleotide sequence of claim 1 (a) or the nucleotide sequence complementary to the complementary strand thereof, wherein said oligonucleotide comprises 15 nucleotides or more.
 10. Use of the oligonucleotide of claim 9 as a primer for synthesizing a polynucleotide.
 - 35 11. Use of the oligonucleotide of claim 9 as a probe for detecting a gene.
 12. An antisense polynucleotide against the polynucleotide of claim 1, or the portion

thereof.

13. A method for synthesizing a polynucleotide, the method comprising:

a) synthesizing a complementary strand using a cDNA library as a template, and using the primer of claim 10; and

5 b) recovering the synthesized product.

14. The method of claim 13, wherein the cDNA library is obtainable by oligo-capping method.

15. The method of claim 13, wherein the complementary strand is obtainable by PCR.

16. A method for detecting the polynucleotide of claim 1, the method comprising:

10 a) incubating a target polynucleotide with the oligonucleotide of claim 9 under the conditions where hybridization occurs, and

b) detecting the hybridization of the target polynucleotide with the oligonucleotide of claim 9.

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